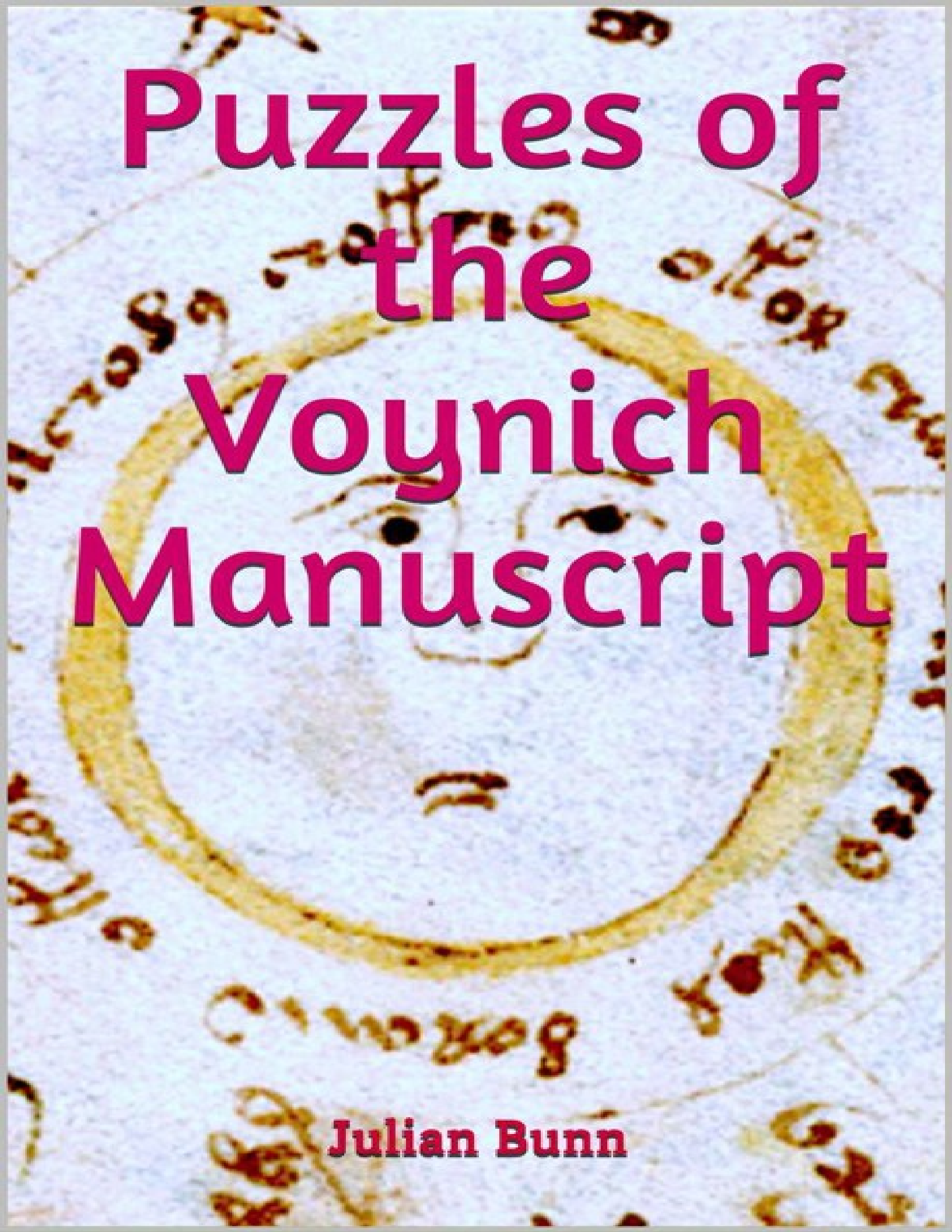
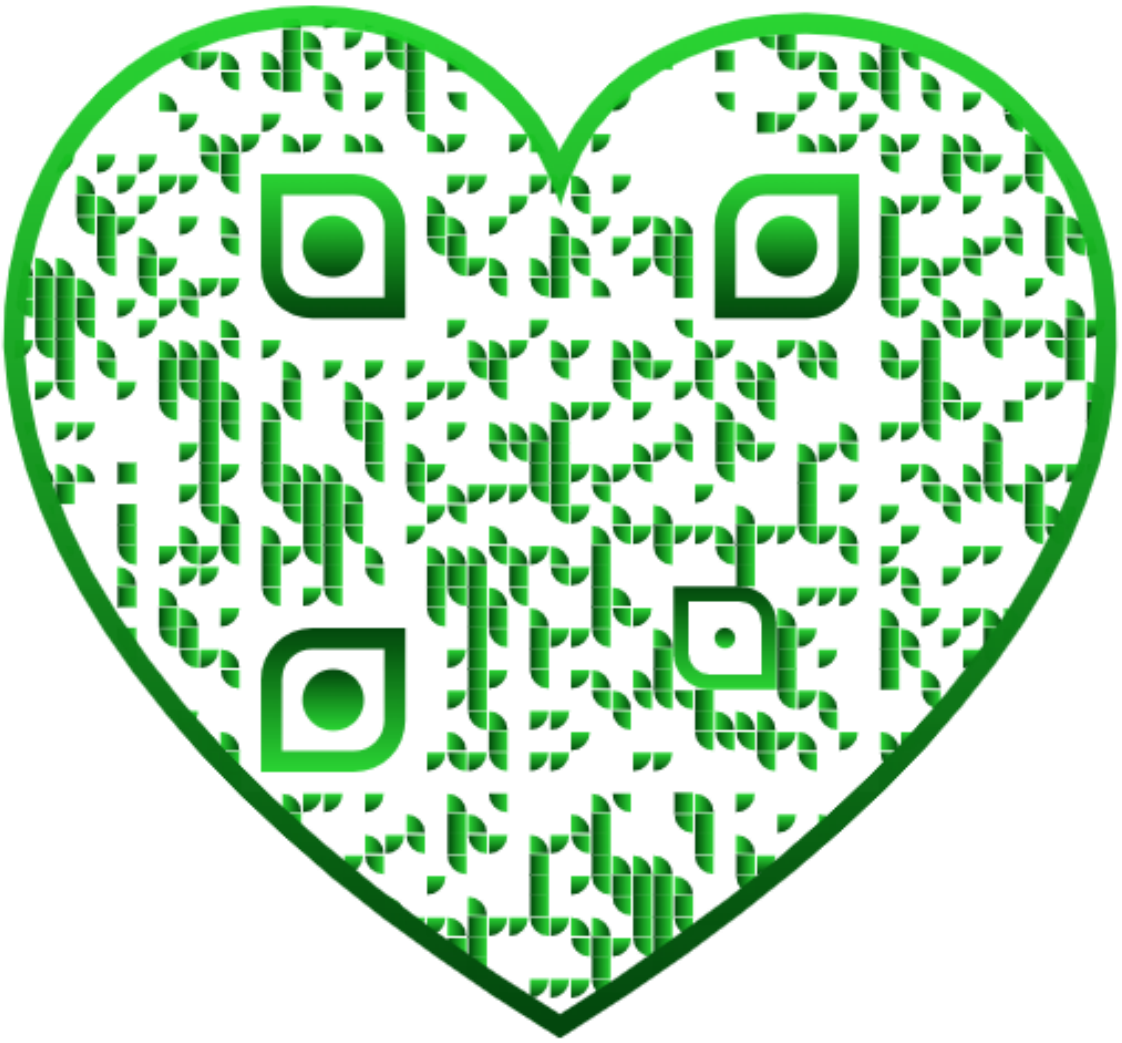

Puzzles of the Voynich Manuscript
Julian Bunn



Puzzles of the Voynich Manuscript

An Illustrated Guide to the Perplexing Puzzles of MS Beinecke 408

Preface

What is it about the Voynich Manuscript that has defied all attempts by amateurs and professionals to extract meaning from its pages? In this guide, we will enumerate the main features of the manuscript that make it so perplexing and hard to decipher, and which make it an almost irresistible challenge for anyone who enjoys solving puzzles.

The guide is targeted mainly at those who have recently come across the manuscript, and are wondering what all the fuss is about, and why, after more than a century of effort, nobody has cracked its code yet. It will perhaps also be useful as a set of tests for those who believe they may have cracked the code, so that they can see how their solution matches up against each of the puzzles described. And finally, it is hopefully of interest to those already familiar with the manuscript – perhaps they will see something thought provoking here.

In the guide, we'll look at the text, the drawings and coloring, and the notes that appear in the margins – the "marginalia". We'll see that drawings that at first glance appear to be obviously of a known object, on closer inspection fill us with doubt. We'll look at how the drawings are sometimes sloppily or incompletely colored. We'll see some strange properties of the text, where the same word is repeated twice, thrice and sometimes four times in a row, and where the letters – "glyphs" – that make up the words, and which comprise an apparently unique collection, are placed according to rules that change as we work through the manuscript. We'll see drawings of naked ladies in bathtubs that are filled with green or blue water, or who are holding tubes of liquid, or who lie prostrate amid cups of porridge. We'll puzzle over the "cipher keys" that appear on several folios – sequences of 17 glyphs that suggest a simple Caeser cipher, but are not quite so simple, and fail to deliver a decryption. We'll notice similarities in some of the drawings to mediaeval castles, to armadillos, to the human digestive system, to Sunflowers, to spread eagles and to medieval maps, all of these similarities will initially prompt us to feel like we are on the verge of breaking the mystery. But, in the end, after taking in all the puzzles to be described, we will realize that we are no closer to understanding the book than when we first clapped eyes on it.

But maybe, just maybe, and unlike countless researchers beforehand, you will have explanations and solutions. Perhaps you will see how to decipher the text, or how to read it as a natural language. Good luck - let's hope you do!

Introduction

The Voynich Manuscript, owned by Yale University's Beinecke Library, is a small book of around 240 vellum (calf skin) pages, measuring about nine nches tall by six inches wide and being about two inches thick. It's about the size of a thick paperback book. This is worth bearing in mind when looking at the digitized scans of the folio text and drawings we'll be examining: the details are really quite small.

The vellum used in the manuscript has been carbon dated to sometime in the early 1400s. People who have seen and handled the book in person report being surprised by its small size, the very fine details of the text and drawing, and the thinness and translucency of the vellum pages. As regards its content, nothing else like it has ever been discovered.

The manuscript was reportedly purchased by Wilfrid Voynich, a seller of antiquarian books, from a Jesuit monastery in Frascati, Italy, in the early 1900s. Who owned it before the Jesuits, and who they obtained it from, is a topic of some controversy: the provenance is patchy, but it appears certain that the manuscript was in Prague for some considerable time. Voynich remarked that it was an "ugly duckling" compared with the traditional illuminated manuscripts he was used to dealing with. He became convinced that it was authored by Roger Bacon (who died in 1292, and so cannot have been the author, based on what we know now of the vellum dating), and pitched it as such in an effort to sell it for a large sum of money. It ended up at Yale when it was donated to the Beinecke by another bookseller, Hans Kraus, who in turn had obtained it from a friend of Voynich's widow.

If you would like to look at the manuscript yourself (and you surely will!), the Beinecke Library have kindly made available high resolution digital scans of all the folios, and they can be viewed on the Library's website. They are also available at a web site created by Jason Davis: Jason's site makes moving between and magnifying the folios much more convenient, and his system offers a handy way of pinpointing a particular place in the manuscript with a simple URL. All the illustrations in this book are from the Beinecke scans kindly provided by Yale University and made freely available.

In the sections that follow, when referring to features in the manuscript, we'll use the standard notation: for example, "f22v" means the verso (back) side of folio (page) number 22. To find a full image of this folio you can point your browser to https://www.jasondavies.com/voynich/#f22v

The First Folio

Figure 1 shows the very first folio of the Voynich Manuscript. You will notice the rather poor state of the vellum, it having been thumbed, fingered and scuffed over years of use, as well as ravaged by bookworms, damp and other debilitating factors. The written words are a little faint and faded, despite some modest adjustments made to the digital image in the Figure. You will notice how the green leaves from the drawing on the verso side of the folio are visible through the thin vellum.

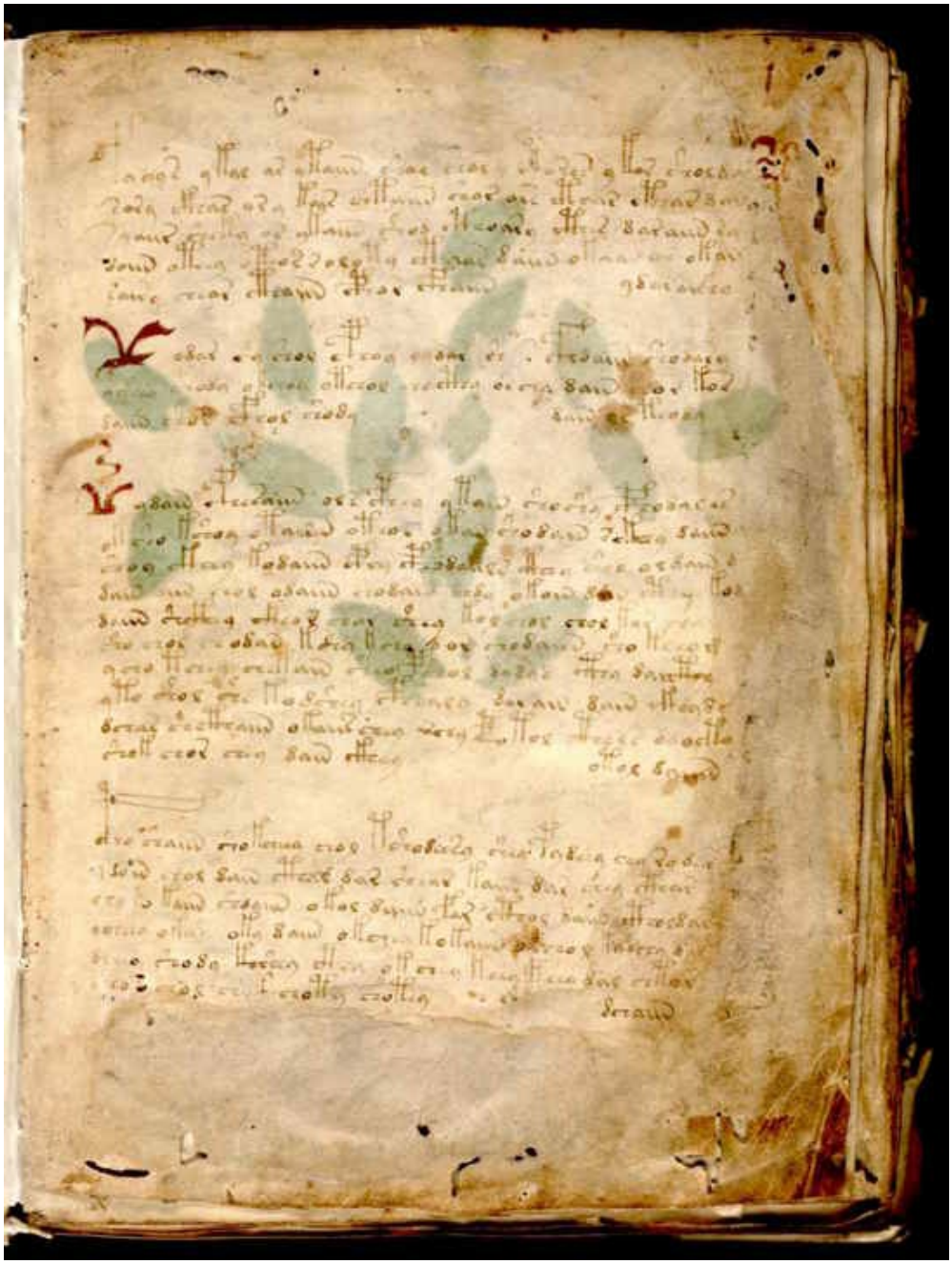


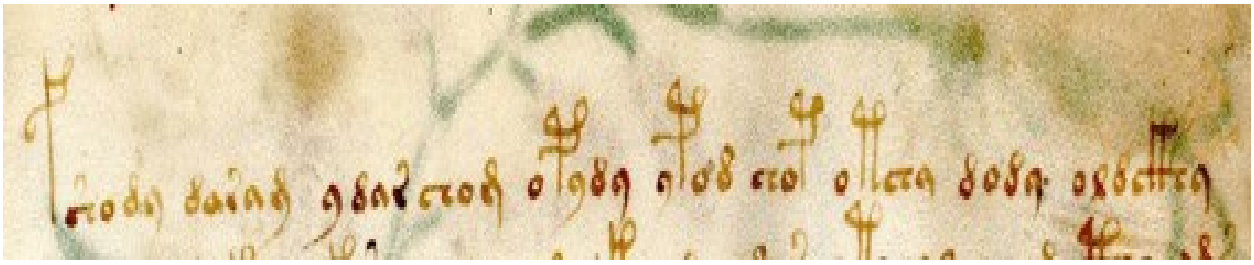
Figure 1 The First Folio, f1r, of the Voynich Manuscript

Many researchers suppose that this first folio is an introduction to the book, and which has brief descriptions of the topics covered. The three ornate red letter glyphs that appear on this folio are mysterious: they do not look like any of the glyphs elsewhere in the manuscript, nor are they recognizable

symbols from medieval literature according to experts (although the first is similar to paragraph or topic markers found in Spanish manuscripts). It's possible that they are obscure alchemical symbols.

The Text

If we are to understand what the Voynich Manuscript is about, we need to be able to read it. The text has been studied as being potentially a cipher, a code, or the transcription of a natural language. Investigators have included highly skilled and talented cryptographers, linguists and experts in ancient manuscripts. All of them, as well as numerous amateur enthusiasts, have failed to come up with a convincing explanation of how the text is constructed, and not a single word has been deciphered to the satisfaction of more than a few, perhaps delusional, individuals!



The first line of text on f17r

The line of text shown above as an example is the first line from folio 17r. Some of the letters are immediately recognizable: we see "8", "9", "o", "a", and a letter that looks a bit like a "2". The others are more mysterious, such as the first letter of the first word, which resembles a flagpole. The next letter looks like a pair of "c"s joined together with a squiggle above. The word positions of some letters are noticeable: "9" mostly appears at the start or end of a word, and not in the middle.

In the next sections we will explore the appearance and properties of the Voynich words and their constituent glyphs, the apparent rules that govern how they appear in labels of the drawings, and remark on how some of these features continue to confound efforts at the manuscript’s decryption.

Entropy

One of the first questions we should have about the text is: does it have meaning? One of the ways to measure whether a text may contain information is to evaluate its entropy. The Shannon Entropy of a string of text measures the information contained in the text. For a text that is completely random i.e. where the appearance of any character is as likely as the appearance of any other, the entropy (which can be thought of as "disorder") is high. In contrast, a text which is a long string of identical characters has the lowest entropy: the least amount of information. Text that is somewhere in between carries more or less information. Even though we cannot decipher the Voynich Manuscript's text, we can measure its entropy. If the entropy is high, then the text may well be random gibberish. If it's low, the text likely contains information, because it is very ordered.

Mathematically, the Shannon Entropy is defined as:

$$Entropy, E = -\sum_{i}^{N} Prob_i \,.\, Log(Prob_i)$$

To calculate the Entropy, we first calculate the probability (called $Prob_i$ in the equation above) of each glyph we come across in the Manuscript – this is just the number of times the glyph appears, divided by N, the number of all letter appearances. Once we have $Prob_i$ for each glyph, we can calculate the Entropy by working through all the glyphs as we come across them, in all the folios, and sum up the probability of each times its logarithm.

Let's look at some results from computing the Entropy for various texts:

Language	Source Text	Entropy
None	Random Gibberish	6.0
Medieval Italian	Dante 1320	4.2
English	Thomas Hardy 1874	4.2
German	Cookbook 1553	4.1
Spanish	Medina 1543	4.1
Latin	Cantus Planus	4.0
French	Text from 1367	4.0
Voynich	***Voynich Manuscript***	***3.7***

The "Random Gibberish" in the table is an artificially generated text that contains letters picked at random from the alphabet. The other results are obtained from analysing several texts written in different languages, together with the result for the Voynich Manuscript.

The results are clear: according to this measure the text in the manuscript is ordered, and very different to random gibberish. We can conclude that there is indeed meaning in the written text.

Some researchers prefer to use the "second order" Entropy as a measure - this is similar to the Shannon Entropy, except it instead shows the probability of finding a letter/glyph given the one preceding it. The second order Entropy also comes out low for the Manuscript.

The Voynich result in the table above was obtained using the so-called EVA transcription of the Manuscript's text into computer-readable characters - the transcription was made by Takeshi Takahashi. Transcribing the Voynich text is not a simple task, since the true alphabet used is unknown. Thus it requires decisions on whether each of the observed glyphs in the writing should be transcribed as a single character of the alphabet or as more than one character joined together. For example, is the glyph ce a single character, or is it two characters c e? The choice of transcription will affect the Entropy measure to some extent.

The Labels

At the sides of many of the drawings are words: it’s reasonable to assume these are labels or captions. One odd property of these labels is that the word(s) in the label almost never appear elsewhere in the text on the rest of the same folio. This is surprising. Suppose you are writing about plants, and you have a page devoted to the deadly nightshade. You’d have a drawing of the plant and you'd probably write the label “Deadly Nightshade” next to it. In your description of the plant you’d probably use the words “deadly” and “nightshade”, at least once. And yet, in the Voynich Manuscript, most of the label words on a given folio don’t appear in the text on that folio, even when they appear elsewhere in the Manuscript.

There is a possibility, suggested by this anomaly, that the folio's drawings don't have anything to do with the text on the folio.

Another curiosity of the labels is that the same label word appears next to completely different drawings. For example, the label otol89 appears next to objects on five folios, yet there is little apparent similarity between the objects it’s labeling, as can be seen in Figure 2, where the five label occurrences are underlined by red bars. There are counter cases, such as with the label otal89 which appears on folios 88r, 99r and 101v2 next to plant roots that may show the same root. Further, as an example of a label which appears to identify the same object on some folios, but a different object on others, we have label otal9. This appears on folios 84r, 88r and 99v: it labels a root on 88r and 99v, but part of the ladies’ bath piping system on 84r.

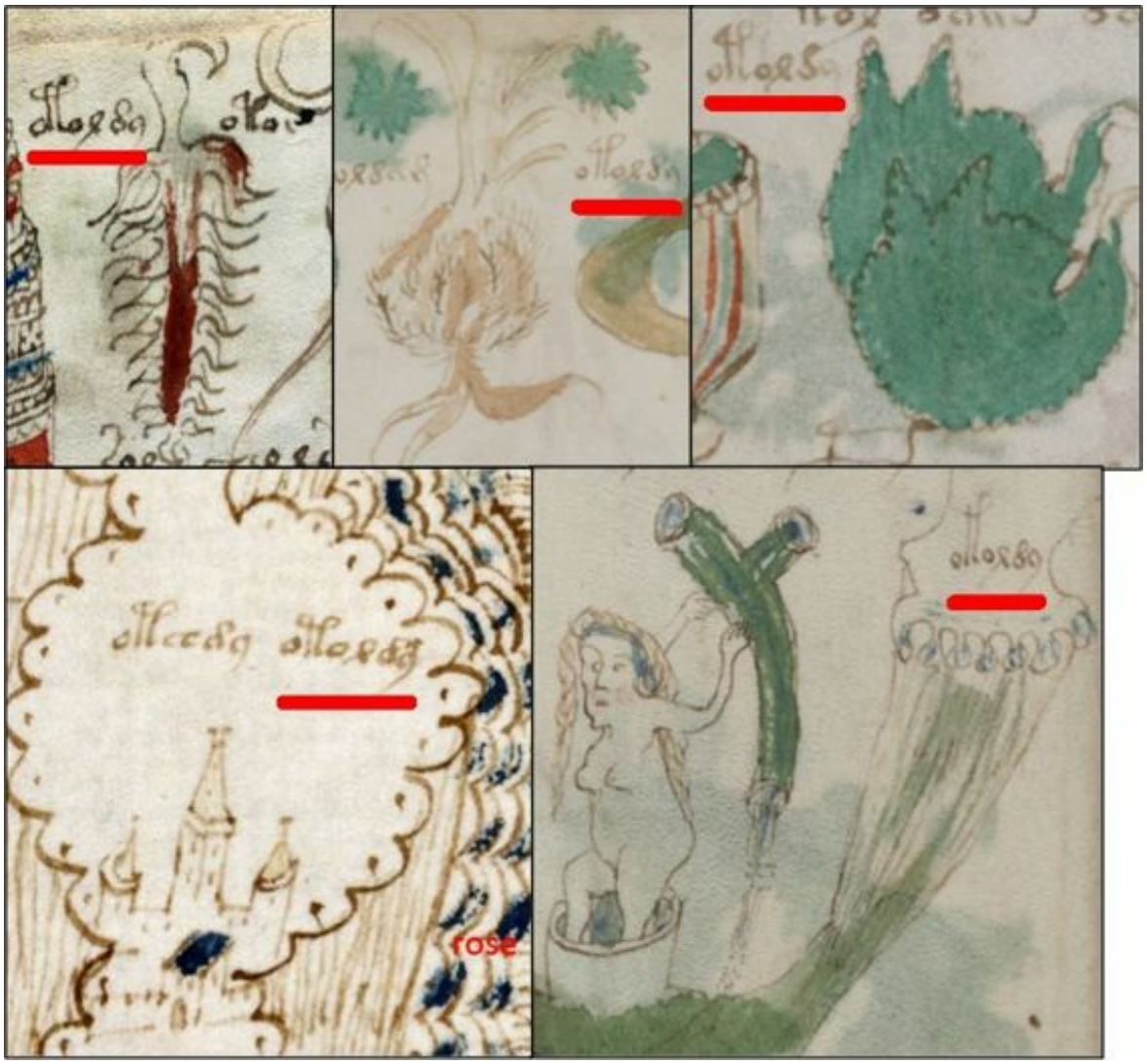


Figure 2 The Label otol89 as it appears on folios 99v, 89r1, 89r2, the Rosettes and 82v (LtoR,TtoB)

Currier Language A and B

Captain Prescott Currier, a cryptographer, examined the Voynich many moons ago, and made some very perceptive comments about it. In particular, Currier noticed that the handwriting was different between some folios and others, and he also noticed (based on glyph counts) that there were two "languages" being used:

“When I first looked at the manuscript, I was principally considering the initial (roughly) fifty folios, constituting the herbal section. The first twenty-five folios in the herbal section are obviously in one hand and one ‘‘language,’’ which I called ‘‘A.’’ (It could have been called anything at all; it was just the first one I came to.) The second twenty-five or so folios are in two hands, very obviously the work of at least two different men. In addition to this fact, the text of this second portion of the herbal section (that is, the next twenty-five of thirty folios) is in two ‘‘languages,’’ and each ‘‘language’’ is in its own hand. This means that, there being two authors of the second part of the herbal section, each one wrote in his own ‘‘language.’’ Now, I’m stretching a point a bit, I’m aware; my use of the word language is convenient, but it does not have the same connotations as it would have in normal use. Still, it is a convenient word, and I see no reason not to continue using it.” -- Currier

To be clear, what Currier observed was that the word frequencies in the first twenty-five herbal folios is different to the word frequencies in the second twenty-five. This is quite striking. Indeed, the whole manuscript may be divided roughly into two groups of folios, those written in “Language A”, and those written in “Language B”. Of course, since we don’t know what the words actually mean, we cannot say that the language is different, just that the word frequencies are different.

For example, the ten most popular words in the Language A herbal folios are written daiin, chol, chor, s, cThy, Shol, Sho, chy, dy and dar. Whereas in Language B, the ten most popular words in the herbal folios are aiin, or, daiin, chedy, ar, dar, qokedy, chdy, Shedy and chckhy. You may notice that

the only word common to both lists is daiin. As it turns out, there are words that appear commonly in Language A, but hardly ever in Language B. For example cThy appears over 60 times in the Language A folios, but only once in the Language B folios. Conversely, 4okain appears around 160 times in the Language B folios, but only once in A (and perhaps that one folio has been wrongly accredited to Language A)!

What are some possible explanations for these puzzling differences? One theory is that as the manuscript was being written, the code or cipher or transcription changed, either gradually or as the scribes became more practiced at writing it. Another theory is that the cipher settings were changed between when the A folios were written and when the B folios were written – possibly a cipher wheel or other mechanism used to aid the enciphering process was reset between the two. Yet another theory is that the Language differences are due to different phonetic transcriptions of a natural language being transcribed: one scribe heard the sounds differently from the other, or there were several individuals whose speech was being transcribed, each having different accents or intonations.

The Gallows Glyphs

The glyphs in the Voynich words appear to be a mixture of standard medieval script letters and some unfamiliar items that look like this: t k f p. Nobody has proposed a convincing explanation of what these glyphs, which are called “Gallows” glyphs, represent. Nor has anyone explained why the gallows glyphs are sometimes “benched” (see Figure 3), and appear thus: F T K P. Fascinatingly, when the benched gallows appear, they are typically overlaid with the pair of glyphs that look like c h, so that the composite glyph looks like this, for example: cPh. The first word on each folio, and of each paragraph, is often a gallows glyph, although the glyphs do also appear in the middle of other words. Another feature is that the gallows glyphs almost never appear as the last glyph in a word.

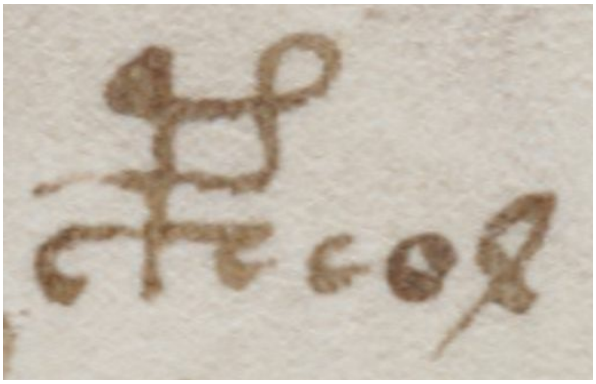


Figure 3 Showing a benched gallows glyph cPh in a word on f99r

On some other folios the initial gallows glyph is highly ornamented. Examples are shown in Figure 4.

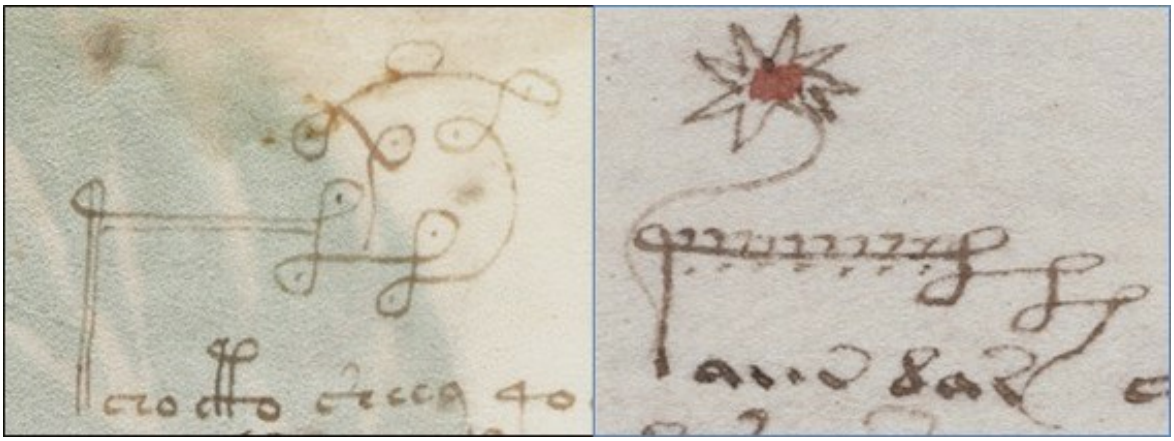


Figure 4 Ornate Gallows examples from f42v and f105r

Some investigators have proposed that the gallows glyphs are capital letters, as they often appear at the start of the first word on a page, as noted. Embellishments on initial letters are quite common in medieval manuscripts, and so those we observe on the gallows lends credence to the theory that they are capital letters. As for the benched gallows, there are theories that they are phonetic variations of the un-benched glyphs.

Whatever the gallows glyphs mean or represent, the positions they are found in on each folio have some curious features. Figure 5 shows one of the folios from the so-called "Recipes" section at the end of the Manuscript:

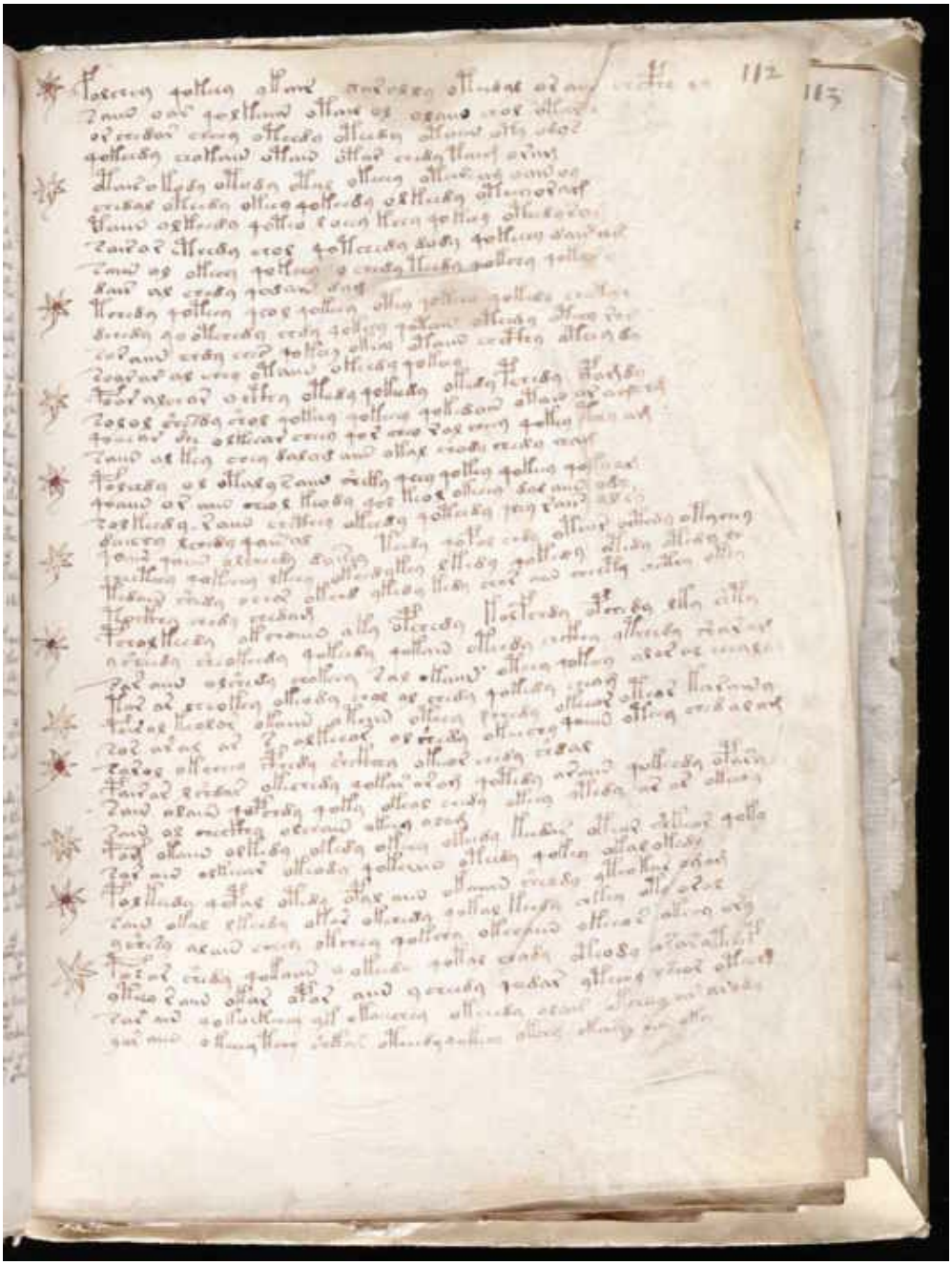


Figure 5 Folio 112r from the Recipes section

The diagram in Figure 6 has been generated from a transcription of f112r: it's a pixel map of the location of f gallows (red pixels), p gallows (blue pixels), and all other glyphs (black pixels) on the folio.

What is quite clear from the diagram is that the p glyphs (blue) like to be at the start of lines. As for the two f glyphs (red), the first appears as the first glyph on the folio, at the start of the first line, whereas the second is approximately in the middle of the folio: nowhere near the start of a line. Perhaps the affinity the gallows glyphs have for line and folio start is simply evidence that each "recipe" on the folio begins with a capital letter? Or is the affinity pattern an indication that the words were placed on the folio according to some unknown scheme or ordering?

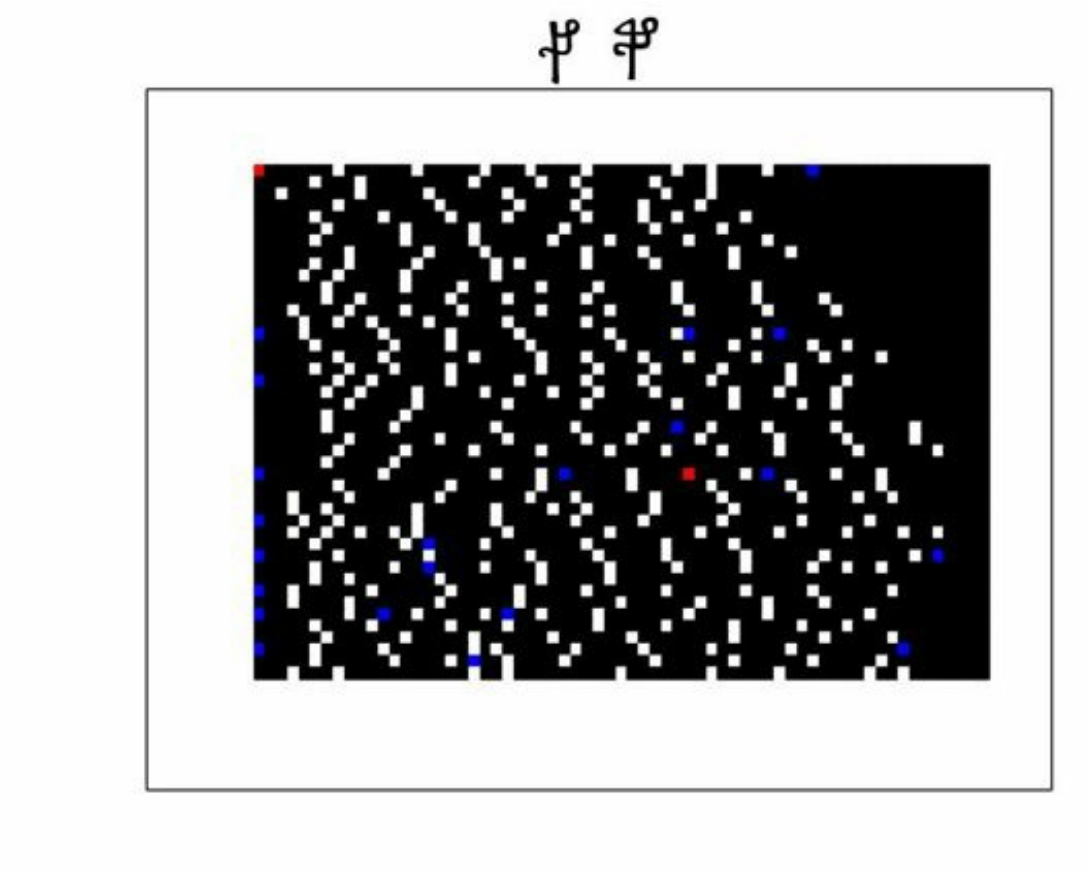


Figure 6 Locations of the f p gallows glyphs on folio 112r

The 4o Glyph(s)

Throughout the manuscript's text, we see many words that begin with the glyph pair 4o, but the pair almost never appears inside or at the end of a word. Indeed, the 4 glyph almost never appears on its own without its o. Many have taken this to mean that 4o stands for a pair of letters that are usually inseparable. In English such a pair is "qu", and that would mean that words like qokol might decipher to, for example, "queen" if the plaintext is English. Others have theorized that 4o is just one of many prefixes and suffixes that are being encoded, that it is perhaps a single glyph. If you look in fine detail at the folios where it appears, then it does seam from the pen or quill strokes that 4o is written as a single glyph in many cases. But, then again, a written "qu" would often look as if it is written as a single glyph.

daiin daiin daiin

Here is one of the most peculiar features of the text. Several times we see the same Voynich word repeated twice, three and even four times in succession. An example is shown in Figure 7 where daiin is repeated.

Figure 7 The word daiin repeated on folio 89r2

In this example, careful examination of the final glyphs n show that they differ slightly: the top loops are angled differently and the inking suggests that perhaps they were added later. But are these differences significant?

Another example is shown in Figure 8 where chol is repeated three times.

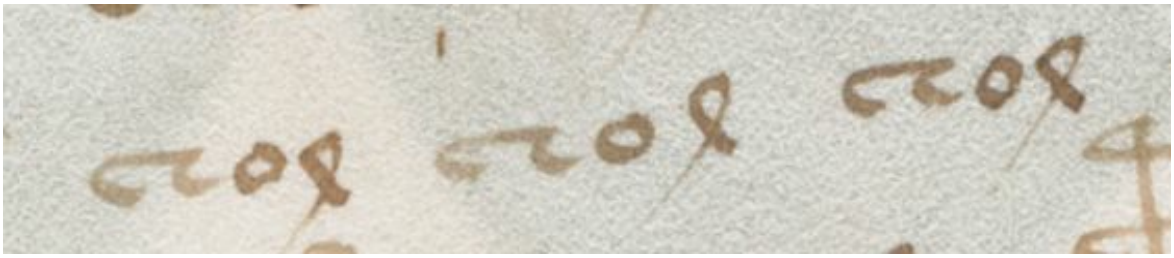


Figure 8 The word chol repeated on folio 8v

This is a very challenging feature to explain away for most cipher theories. There are contrived examples we can point to in English where the same word appears multiple times in succession, for example: "*All the faith he once **had had had** no effect on the outcome of his life.*" (There are many more examples like this at https://en.wikipedia.org/wiki/List_of_linguistic_example_sentences.) But why would such contrivances appear in an early medieval text? Perhaps the text is Plainchant – the monotonous repetition of the same words and phrases? On the other hand, if it is plainchant, why do we not observe more

of the Voynich text being repetitious in the same way?

It’s worth noting here that the examples shown for repetitions of the Voynich words daiin and chol involve two very statistically common words in the manuscript – these are not rare words.

Some other explanations for why the word repetitions occur is that they are by-products of the enciphering method, or unforeseen redundancies, or errors, in the cipher.

Or Or Or r

As well as word repetitions, there are numerous curious looking examples of glyph pairs being repeated across several words. An example is shown from f15v in Figure 9 where the glyph pair or repeats four times in a row.

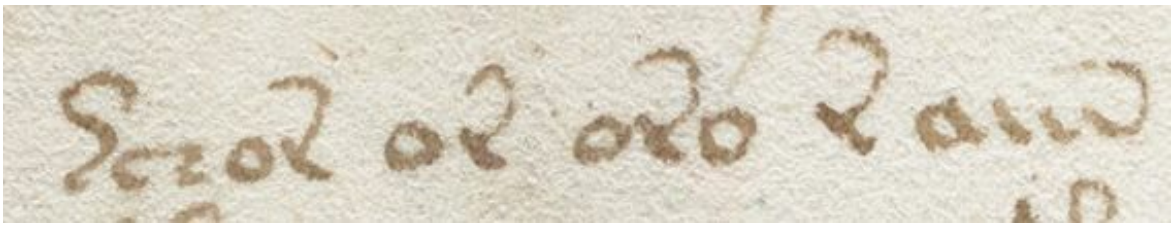


Figure 9 Strange glyph sequence on folio 15v

This peculiar feature of the text is hard to explain unless perhaps the glyphs represent numbers in some way (see The Theory of Numbers below).

Sequences of Slightly Differently Spelled Words

Many words differ by only one or two glyphs, and several words of minimal difference in spelling frequently appear in sequence. An example from f66r is shown in Figure 10.

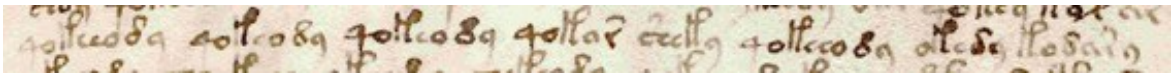


Figure 10 Sequence of words on f66r with slightly different spelling

Here we have a line of text that reads qokeeody qokeody qokeody qokar sheky qokeeody okedy kodary where the first word differs from the second by one glyph, the third is identical to the second, the fourth word has the same prefix as the first three, and the sixth word is a repeat of the first. It's hard to think of a language that exhibits such word spelling patterns when written down.

One technique for quantifying this feature is to look at the so-called "edit distance" between adjacent words. The edit distance is the number of single character edits needed to transform one word to another. For example, the edit distance between the words "hid" and "had" is 1, since only one character needs to be changed: "i" to "a". Most natural language prose tends to have a large average edit distance, which is easily seen by looking at each word of this sentence, for example, and mentally adding up the edits needed to change each word into its successor. However, if the text words are sorted alphabetically, the edit distance reduces. Is this what we are seeing in the text from f66r? Have the Voynich words been written down in some sort of order?

The following fascinating conjecture was proposed by researcher Philip Neal, who gave the following instructions: 1) Divide a plaintext into lines, 2) Sort the words of each line into alphabetical order, 3) Sort the letters of each word into alphabetical order. Philip gives the following example:

one thing led to another thing last night

another last led night one to thing thing

aehnort alst del ghint eno ot ghint ghint

In the example, we see how the two words "thing" end up together, and how certain letters, like "t" tend to end up at the end of words. These properties are strongly reminiscent of some patterns we have observed in the Manuscript's text.

The Month Names

Folios 70 through 73, the Zodiac folios, show twelve circular charts, some on fold-outs. At the center of each chart are small drawings depicting various objects, animals and people, which are synonymous with the Zodiac signs. Spaced around the circles are a number of mainly female figures, mostly naked, the number of which varies from chart to chart.

The folios are generally supposed to represent months of the year and signs of the Zodiac, and the figures perhaps represent degrees of each sign. Indeed, next to each of the central drawings is a month name written in plaintext. These writings, unlike the rest of the folio's text, appear to have been made later, in a different hand, after the manuscript was complete. The handwriting style of the month names looks similar to the “Michiton Oladabas” writing on f116v, which we will discuss later. Figure 11 shows a mash-up of the month names from all the folios.

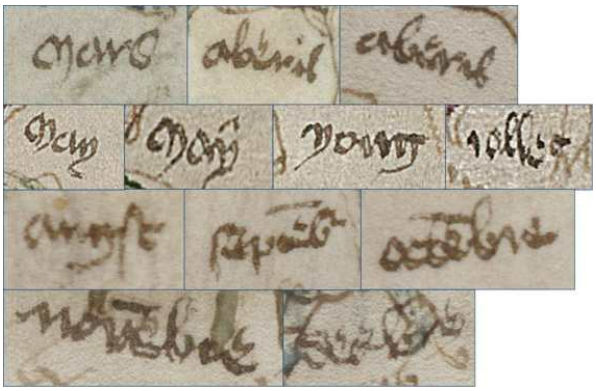


Figure 11 Month names seen in the Zodiac folios

As can be seen from the table below, the spelling of the month names is interesting, as is the intersection with the Zodiac signs. (January and February are missing from the Manuscript, almost certainly due to there being a missing folio, f74, which has been lost.)

What language are these month names written in? Perhaps if we could identify it, we would know the underlying language the rest of the manuscript has been enciphered from? Or,the language may be that of a later hand, a

would-be decipherer trying to make sense of the diagrams. Based on http://www.omniglot.com/language/time/months.htm the language Occitan (from a region in Spain) appears to be a decent (but underwhelming) match. (Some researchers prefer a match to medieval Northern French.) The Occitan names are included in Table 1 below, as is the count of the number of figures appearing (we'll examine that puzzle next), as well as the Zodiac signs that appear to correspond to the drawings.

Table 1 The Month Names, Figure Count and Zodiac Signs on Folios 70-73

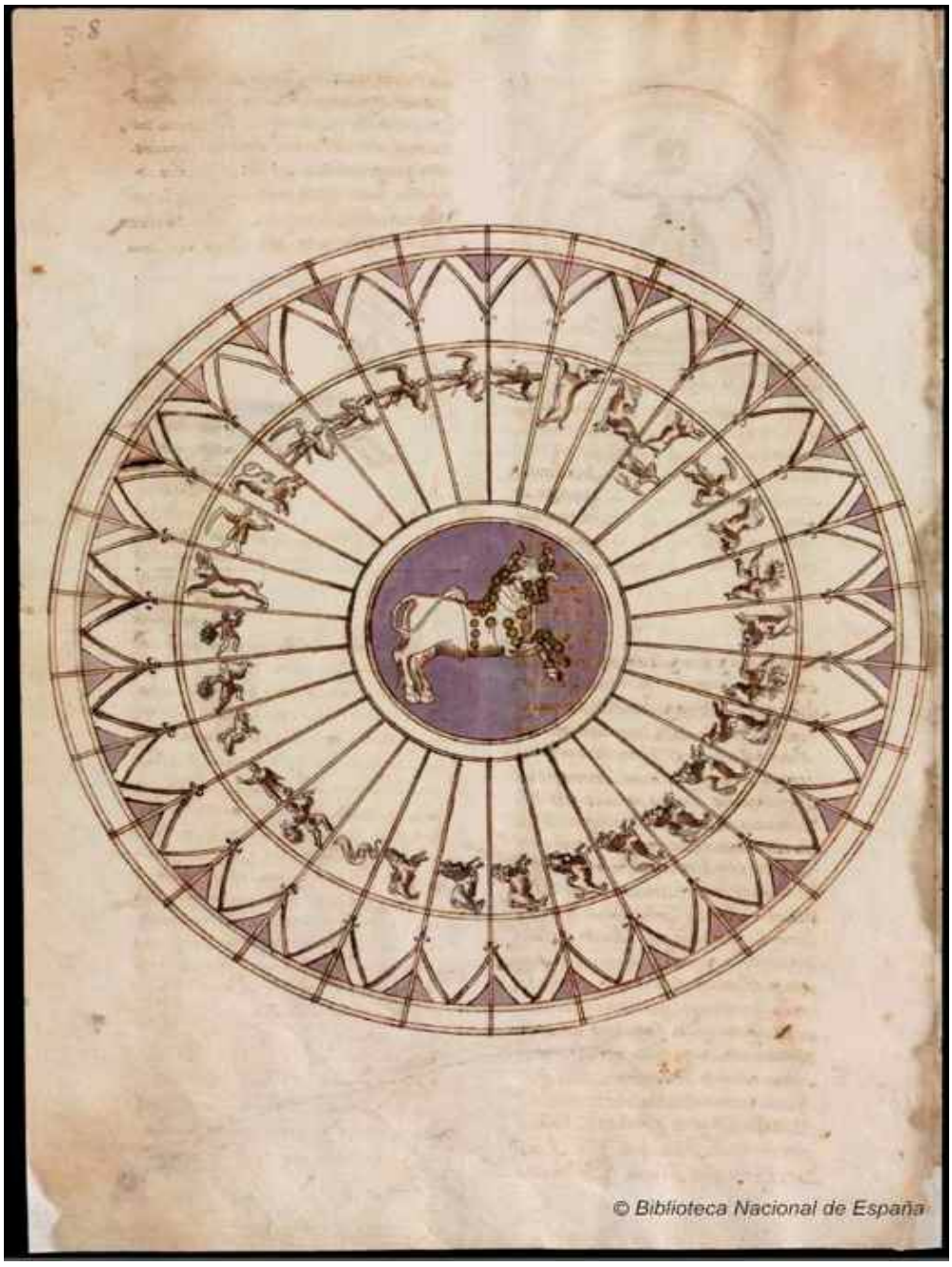
Folio	Month Name	Number of Figures	English/*Occitan*	Zodiac Sign
f70v2	mars (març?)	29	March/*marc*	Pisces
F70v1	aberil	15	April/*abril*	Aries (Dark)
f71r	aberil	15	April/*abril*	Aries (Light)
f71v	may	15	May/*mai*	Taurus (Light)
f72r1	may	15	May/*mai*	Taurus (Dark)
f72r2	jong (?)	30	June/*junh*	Gemini
f72r3	jollet (?)	30	July/*julhet*	Cancer
f72v3	augst	30	August/*agóst*	Leo
f72v2	septembr (?)	30	September/*setembre*	Virgo
f72v1	octebre	30	October/*octobre*	Libra
f73r	novebre	30	November/*novembre*	Scorpio
f73v	decebre	30	December/*decembre*	Sagittarius

Referring to the summary above, April and May are given two diagrams each. Why is this? Let's take a look at the two May drawings side by side:

The two May roundels.

The figures in each diagram number 15 that is 10 in the outer ring and 5 in the center, for a combined total of 30. But since May has 31 days the figures cannot be representing days of the month.

One possibility is that the 30 divisions are not days, but degrees. Each degree is associated with a stone (like sapphire, diamond, and so on), which was believed to have mystical powers. The Lapidary of Alfonso X "The Learned" is a thirteenth century text devoted to the stones written in Castillian (old Spanish), and is a translation of a much earlier Arabic document. An illustration from the Lapidary is shown below.



Taurus in the Alfonso X Lapidary

This folio from the lapidary shows Taurus. Notice that there are figures, animals and people, drawn in each of the 30 angular segments, and that the central bull is marked by a constellation of stars. The accompanying text in the Lapidary describes the stones associated with each of the 30 degrees, and how they relate to the stars in the constellation of Taurus. Could it be that the

Zodiac folios of the Voynich Manuscript are describing the properties of stones, and that the figures holding stars are indicating the star members of the respective constellations?

The Cipher Key and Picnic Table Glyph

When poring over the folios of the manuscript, many researchers have come across what might be cipher keys in the form of letter or number sequences. Such sequences are prominent on f49v, f57v, f66r, f75v and f76r and are shown in Figure 12 and Figure 13.

Figure 12 Columns of Key Sequences on Folios (LtoR) f49v, f76r, f75v and f66r

On f69r we have another sequence, this time in a circle, in the center of the diagram: d o l s em y

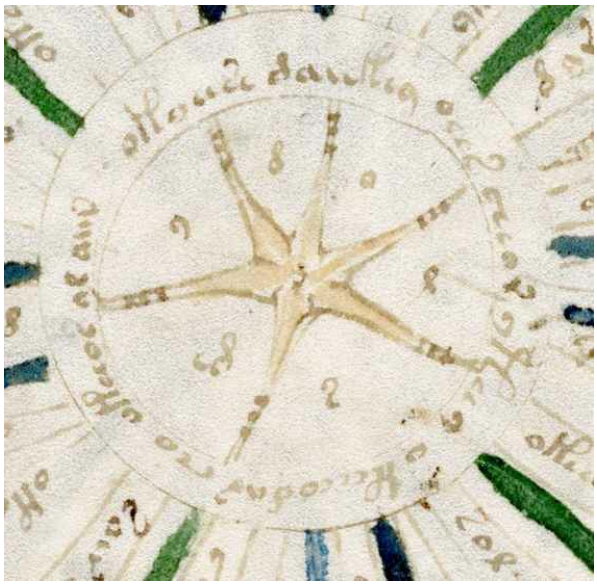


Figure 13 Sequence on f69r

The circular diagram on f57v (Figure 14 below) is especially interesting, as it is unlike the other circular diagrams in the manuscript which typically depict months or stars. In contrast, f57v shows four human figures in the central roundel, and an outlying set of circular rings containing words and glyphs.

Figure 14 Folio 57v : The Key of 17 Glyphs

The start position of the text/glyph sequences in the rings is at 10 o'clock. Looking at the ring one in from the outside, the glyphs are apparently grouped into four approximately identical sets of 17. Each set of 17 looks like

this:

o	l	d	r	v	x	k	m	f	©	t	r	ª	Ö	y	I	¬

Table 3 The Sequence of 17 Glyphs on f57v

What do these 17 glyphs represent? A few of the glyphs are very rare in the rest of the manuscript, for example the so-called “picnic table” glyph in position six: x and the “reclining figure” glyph in position 10: ©. Perhaps the 17 glyphs represent 22 letters from the classical Latin alphabet, with the vowels (A,E,I,O,U) removed, i.e. BCDFGHLMNPQRSTXYZ. Perhaps the picnic table glyph is “Z”, due to its rarity? Another notable feature of the sequence is that glyph v is in the fifth position - this glyph looks like an upside-down V, which is the Roman numeral for 5.

Another possibility, suggested by researcher Nick Pelling, is that the sequence is in fact 18 glyphs long - one of the glyphs in Table 3 being a composite of two glyphs joined together: Ö . This would give a total of 72 glyphs around the ring i.e. one glyph every 5 degrees to make 360 all told.

Key Sequence Summary

The table below summarises the sequences observed:

Folio	Key Sequence
49v	o r y e ~
57v	o l d r v x k m f @ t r ª Ö y I ¬
66r	y o s sh y d o r f * x air d sh y f f y o d r f c r x t o * l r t o x p d
69r	d o l s em y
75v	s l l o r
76r	s d q s o l k r s

Of course, like most everything else in the Manuscript, the sequences turn out not to be very illuminating. Basically, all the sequences are different, which makes interpreting them challenging. Can we even surmise that the sequence of glyphs on f49v, numbered 1 to 5, correspond to those numbers?

Code of Urbino (1440)

Researchers faced with trying to discover the origins of the glyph set observed in the Manuscript have naturally been drawn to investigations of ciphers devised in medieval times. There are many to choose from. A promising example (noted by d'Imperio) is the "Code of Urbino" dating from 1440, and documented in Figure 15.

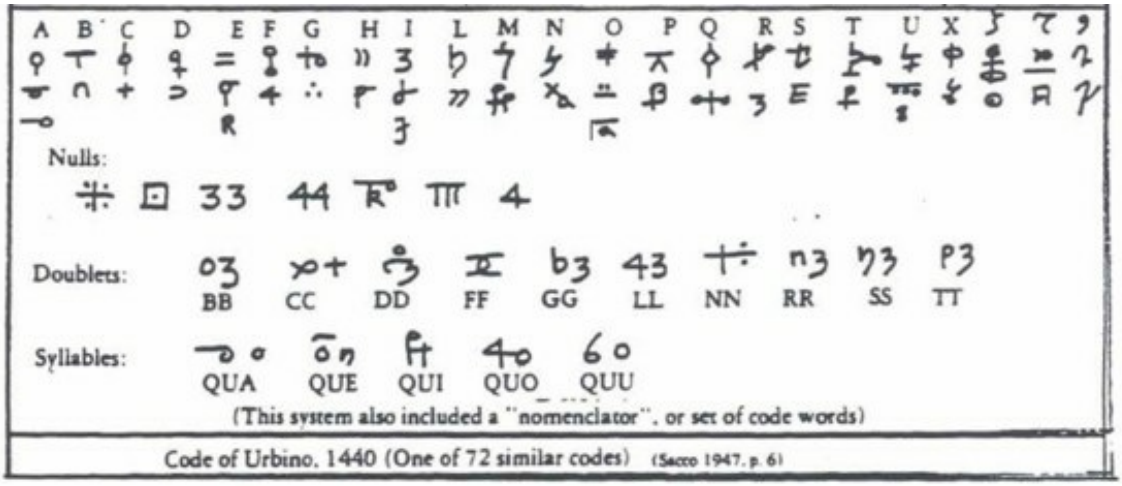

A B C D E F G H I L M N O P Q R S T U X
Nulls:
Doublets:
BB CC DD FF GG LL NN RR SS TT
Syllables:
QUA QUE QUI QUO QUU
(This system also included a "nomenclator", or set of code words)
Code of Urbino. 1440 (One of 72 similar codes) (Sacco 1947, p. 6)

Figure 15 The Code of Urbino (from d'Imperio)

Some of the glyphs used in this cipher are quite similar to Voynich Manuscript glyphs, for example 4o for QUO, x for P. It's also interesting that the cipher uses nulls: these are glyphs which, when found in the cipher text, stand for no letter at all - they are just included to make decipherment more challenging. The other effect they can have is to alter the apparent word length distributions. If there are many nulls, then the length of the deciphered plaintext words will in general be shorter than the cipher words. The presence of nulls may explain why we see so few single glyph words in the Voynich Manuscript text. On the other hand, it is unlikely that a cipher like the Urbino example is what is being used in the Manuscript, as it does not explain some of the features we have observed, such as the repeated words and repeated glyph groups. What is more plausible is that an Urbino-like cipher was used in combination with some other operation on the plaintext. For example, a prior alphabetical sort of the plaintext words to be written, or an arrangement on the folio according to an unknown prescription, followed by enciphering

using an Urbino cipher, might account for the patterns we observe.

The Theory of Numbers

Another theory of how the text is constructed is that the glyphs represent numbers, and that the words are formulae in the numbers. A closely related theory is that the gallows glyphs are to be interpreted in a similar way to the Roman numerals, those that stand for L (50), C (100), M(1000) and so on. So, in this theory of numbers, each word is an expression whose value can be calculated. To take a concrete example, let's look at one of the cipher key folios, f66r, again:

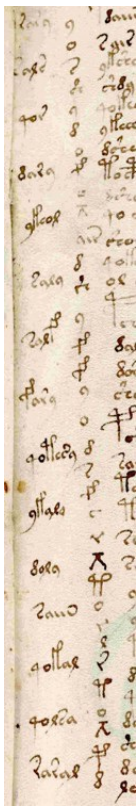


Figure 16 The Formulae on f66r

The late Robert Brumbaugh, Professor of Medieval Philosophy at Yale, who advocated a theory of numbers, suggested confidently that on this folio "*the scribe had indulged his fancy by writing groups of character patterns in what looked like equations: a horizontal set to state the problem, a vertical one for the result*" (Brumbaugh "THE VOYNICH CIPHER MANUSCRIPT: A

CURRENT REPORT", Yale University Library Gazette, Vol 61, No 3/4, April 1987). Looking at the first few equations, we have:

1. rary = yo
2. rals = ssh
3. qor = ydo
4. dara = f?
5. ykcol = xair

The idea here is that when we see the word "rary" in the manuscript, we are to decipher it by first calculating the value "yo", then by converting that to a sequence of numbers, and finally by substituting each number for a plaintext letter, so revealing the original plaintext word.

Michiton Oladabas

The final page of the manuscript contains a tantalizing clue to what the document might be about. At the top of the page, written faintly and the vellum tainted by countless dirty fingers, are some lines of text that appear to be in Latin, with a few Voynich words sprinkled in. To read these words it helps if you are an expert in medieval documents, and used to seeing the forms of letters used at that time. However, even experts can't agree on what is written here. The first couple of words on the second line look like "Michiton Oladabas" to me, what do you think?

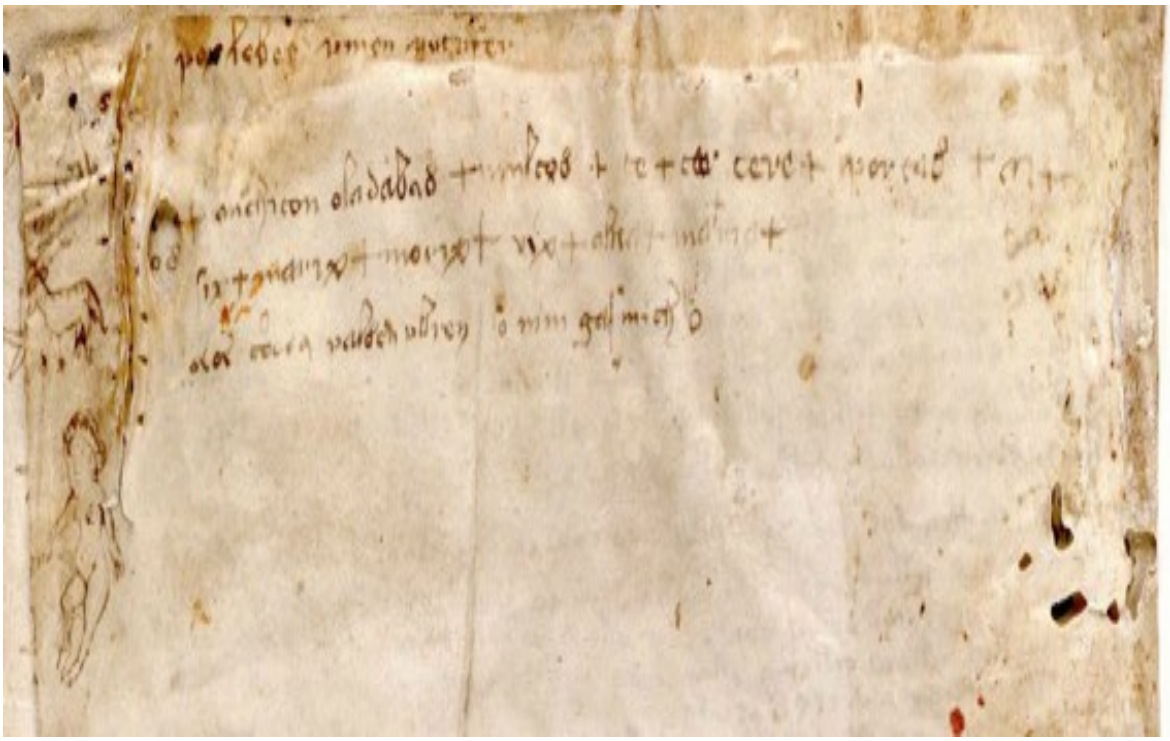


Figure 17 The Curious Writing on f116v

An expert on medieval writing, Johannes Albus, deciphered it thus (abbreviations and omissions in square brackets):

poxleber umen[do] putriter.

+ an[te] chiton olei dabas + multas + t[un]c + t[an]ta[a](?) cer[a]e +

portas + M[ixtura] +

fix[a] + man[nipulis] IX + mor[sulis] IX + vix + alt[e]ra + matura +

... ... (two ciphered words) pals [ein]en pbrey so nim[m] gei[s]smi[l]ch O

Which he translated to:

Billy goat´s liver for wet rot

At the membrane you gave oil, then you bring a lot of the much(?) wax, in a

fixed mixture: 9 hands full, 9 morsels (from) the only just double mature

... ... (two ciphered words), squash it into a paste, then take goat´s milk.

The puzzle here is why the plain text is so hard to make sense of. The presence of two enciphered words at the beginning of the fourth line seems to present a wonderful crib into the cipher: how hard can it be to predict what those two words mean, based on the context of the surrounding plaintext? Apparently it is very hard indeed …

Plaintext on f17r

There is another place in the Manuscript that contains writing that looks like it is plaintext: there is a line of text at the top of Folio 17r. Again, the reading of the words is challenging, see Figure 18:

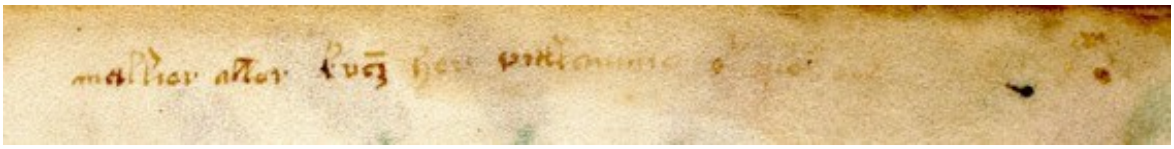


Figure 18 The line of text at the top of f17r.

This looks like (if you squint hard enough): "malhar allar lut3 best vitellum" ... with maybe some faint characters afterwards. (Incidentally, Pelling examined this folio under UV light, and saw evidence of some Voynich glyphs at the end of the sentence.) What might this mean? Let's look at each word in turn:

1. *malhar* - (Portugese) meaning "strike" or "thresh"
2. *allar* - (Icelandic) meaning "all"
3. *lut3* - (Latin) Luteum meaning "yellow". The short line above the "t3" is a macron, and scribes in medieval times usually used it to indicate an abbreviation, most commonly a missing "m" or "n". The "3" itself can mean a missing "ue".
4. *best* - (English) meaning "best"
5. *vitellum* - (Latin) meaning "yolk"

The obvious interpretation is as a puzzling multi-language instruction to "beat all your best yellow yolks" - perhaps in order to make a desert using the plant depicted on the same folio? Could it be that the scribe was jotting down a recipe? Needless to say, this reading and interpretation is highly suspect.

The Drawings

The Plants

On first acquaintance, as we start to leaf through it, the Voynich Manuscript looks quite similar to a medieval herbal (albeit with strange writing) - the first few dozen folios show plants or herbs with somewhat oddly shaped roots. Many researchers never get beyond this similarity: they are rapidly persuaded it’s a herbal, and that the challenge is simply to identify the plants. Thus ensues frustration as each herb or plant is harder to identify than it first appears, perhaps because we are used to seeing pretty lifelike plant illustrations? We'll look at just a couple of examples here.

The Sunflower

The plant in Figure 19 was identified by a botanist (O'Neill) in the 1940s as being a New World Sunflower, despite the fact it looks very little like a Sunflower to an amateur. This caused some interest at the time, since Sunflowers could only have been known to a European author after Columbus' voyage to America in 1493.

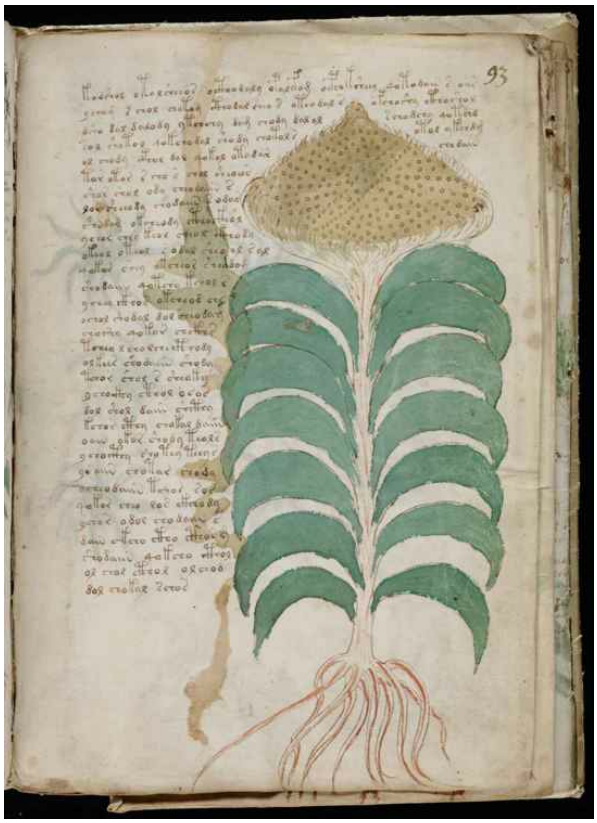


Figure 19 Sunflower (?) on f93r

When Sunflowers are mentioned in connection with the Voynich Manuscript, many assume that the reference is to the plant depicted in Figure 20, on f33v below.

Figure 20 Showing Sunflowers(?) on f33v

This looks much more like Sunflowers, despite the blue petals on the flowers and the odd root balls. Since medieval Alchemical Herbals are filled with depictions of strange roots, and the blue petals may be artistic license, could these really be Sunflowers after all?

Letters in Plants

Many of the drawings in the manuscript appear to have been colored in after the outlines were drawn in ink. Sometimes, small letters are visible through the paint, or in uncolored regions of the drawing. Two examples are shown in Figure 21: the root at the top shows the letters "r o t", and the middle of the leaves on the bottom shows a small “b”.

Figure 21 Detail of the Root on f4r (top) and the Plant leaves on f39v (bottom).

Does this indicate that the root on the left was due to be colored red ("rot" in German) and the space in between the leaves to be blue/blau/bleu in this area? Did the chap with the paint-pot miss both these instructions?

The Armadillo

There are many animals depicted in the drawings in the Manuscript. Some of their identities have long been a source of controversy, for example the “armadillo” drawn in f80v, and shown in Figure 22. Is this really an armadillo, a species which originated in South America, a location at odds with the appearance of other drawings in the manuscript such as castles, or is it in fact a pangolin (scaly anteater) from Asia and Africa?

Figure 22 The Armadillo on f80v

Perhaps it is neither a pangolin nor an armadillo, and is simply an imaginary creature like the dragon drawn in f25v and shown in Figure 23?

Figure 23 The Dragon on f25v.

The Spread Eagle

The spread eagle is an interpretation of the plant root on f46v, shown in Figure 24. Whatever this depicts, it's fantastic and unrealistic as a plant root. Notwithstanding that, and as already noted, the drawing of plant roots in such an extravagant fashion was popular in medieval alchemical herbals. Thus, as Voynich Manuscript puzzles go, it's way down the league table!

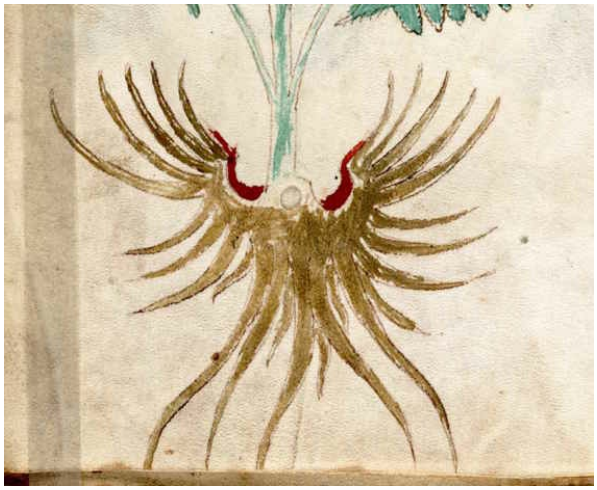


Figure 24 The Eagle-like root on folio 46v

The Jars

The part of the Voynich Manuscript known as the “pharmaceutical section” consists of many smaller drawings of rather plain looking plants, each captioned, and arranged alongside colorful jars. The latter are reminiscent of old fashioned containers for keeping herbs and ointments – apothecary jars or so-called "albarellos". Often the jars have labels written on them, which incidentally reinforces the suggestion that the same person who wrote the text also drew the drawings. A selection of the jars is shown in Figure 25.

Figure 25 A Selection of Jars, taken from f88r1, f89r1 and f102r1 (LtoR)

But are these really drawings of apothecary jars: could they be something else? Researchers have suggested that instead of jars, these drawings depict candlesticks, microscopes, furnaces, needle-cases, salt cellars, or Egyptian perfume bottles. Although the most likely interpretation is that they are apothecary jars, given their proximity to drawings of herbs and roots, the puzzling aspect is that some of the jars sport plinths (seen in the example from f88r1) or feet (seen in the example from f89r1) – features that are apparently unknown for medieval albarellos and jars.

The Castles in the Rosettes

The “Rosettes” is the name given to a fold-out section of the Voynich Manuscript that consists of nine folios, shown in Figure 26. The drawing appears to be some sort of map showing nine circular regions linked together. The interpretation of what these regions represent is pure speculation: nobody has come up with a convincing explanation of what they are and why they are arranged so. Some details strongly suggest a map, notably the appearance of several castles or keeps in the details.

Figure 26 The Rosettes

The most striking of these castles is shown in Figure 27. One significant feature of this castle is the shape of the battlements: square uprights, called “merlons”, with a v-shaped notch. This design is called a swallowtail, or Ghibelline, merlon. Italian stonemasons first started to hew these in the

1300s. Since we know that the vellum of the Voynich Manuscript has been carbon dated to the mid-early 1400s, the depiction of swallowtail merlons is consistent with it being an Italian castle, although it doesn't pin the region down definitively.

Figure 27 Medieval Castle depicted in the Rosettes

The other features of the castle are unexceptional: an arched gateway, two square keeps and a conical roofed tower. Let’s now look at some more castles in the Rosettes, see Figure 28.

Figure 28 More Castles in the Rosettes ...

The castle in the upper drawing has four towers: two with conical roofs, one with a blue flat roof, and one with a roof adorned with two staffs. Searching online for photographs of, or for medieval manuscripts containing drawings of, similar looking castles is a great way to while away many hours. One potential match may be found in the online archives of Frankfurt University, from a 1460 manuscript by Conradus Keyser that appears to describe ways and means of attacking castles, and is shown in Figure 29. In the illustration, four individuals are seen hiding beneath two protective covers, which look like huge thimbles. A fifth figure is apparently in the process of demolishing one of the castle's towers. You will see the similarity between the castle here and the one depicted in the upper drawing of Figure 28.

Figure 29 Attacking Castles - the Huge Thimble Approach (Image courtesy of the University of Frankfurt).

The lower diagram shown in Figure 28 is a little different in that it appears to depict a single circular tower. Some have claimed that the tower is “in a hole”, due to the line shading around it.

These drawings of castles and towers in the Rosettes have some compelling similarities to the appearance of a real castle that stands today: Castle Runkelstein in Northern Italy. Moreover, Castle Runkelstein contains several medieval frescos, dating from the late 1300s, that contain paintings that are reminiscent of some drawings in the Voynich Manuscript. For example, one fresco depicts a castle (shown in Figure 30) which has towers and roofs in very much the same style as we have just seen.

Figure 30 Details from frescoes in Castle Runkelstein (Final image credit Dietrich Krieger).

The swallowtail merlon battlements are quite clearly visible in the final fresco in Figure 30, and we can clearly see them in the contemporary photograph of the castle in Figure 31. It's worth noting that the present day appearance of the castle is different from how it would have looked in medieval times: for example, one of the castle's towers was accidentally

blown up in the 1500s. Note that the drawing style of the faces of the three figures standing looking out of the castle in Figure 30 is very similar to the drawn faces we see in the Manuscript.

Figure 31 Castle Runkelstein in Northern Italy (Image courtesy of www.runkelstein.info)

Are the castles shown in the Rosettes real or imaginary? If they are real castles, do those castles remain today? If so, their locations should give a strong clue as to where the author of the manuscript lived and where he drew his or her inspiration from.

The Naked Ladies and Pipes

The section of the Voynich Manuscript whose contents are perhaps the most puzzling is the so called Balneological Folios. In these folios we see many female figures, in various poses, with a system of interconnected tubes, baths and platforms. The liquids flowing are colored blue and green, and the pipes appear in places to be gushing steam or droplets of water. A typical illustration is shown in Figure 32, where we see a lady who appears to be adjusting a set of pipes and nozzles that are pointed towards her, one nozzle is spraying liquid. The obvious interpretation is that the folios are describing some sort of spa or bathing center.

Figure 32 Naked female adjusting pipes in f77r.

Despite thorough searching by researchers in numerous medieval manuscripts (and in contrast to drawings in the Herbal or Zodiac folios which do bear similarities to many documents), no convincingly similar illustrations of interconnected pipes, nozzles and baths have been found in other works. The fact that only females are depicted in these folios has led to the suggestion that the subject matter of the balneological folios is treatments and medicinal cures for women. Indeed, in that vein, some researchers have noticed convincing similarities between the layouts of the pipes and baths in the folios with e.g. the Fallopian tubes and ovaries (f77v) and the heart (f77r).

The Archer

The illustration on f73v, which corresponds to the zodiac sign Sagittarius, shows a figure using a crossbow, see Figure 33. This is one of the few illustrations in the manuscript that is relatively uncontroversial – there is generally no disagreement about what is shown. There has been exhaustive investigation of the identification of the weapon, and of the dating of the fellow's clothes, particularly his headgear.

Figure 33 The Archer or Crossbowman on f73v

The design of the crossbow in f73v has been studied and compared to the development of the weapon through the ages, and across regions. The most similar designs date to the mid- to late- 1400s and are found in Central European German, and North Italian manuscripts. This of course agrees nicely with the carbon dating of the Voynich Manuscript to ~1440, those dates also being consistent with the headgear the archer is wearing.

The Pleiades

One of the folios that features circular diagrams containing stars is f68r3. One of the segments in the diagram contains a small cluster of seven stars, which is evocative of the Pleiades star cluster, if you happen to know a little astronomy. Figure 34 shows the star cluster, which is labeled doary, and drawn close to a large star which has the label dceolday .

Figure 34 The Pleiades (?) on f68r3

If the seven star cluster is indeed the Pleiades, then the nearby star must be Aldebaran. Here we potentially have two word cribs into the cipher. Many students have tried to use this crib to make some headway into a decipherment of the manuscript, but none have been even remotely successful.

Indeed, on closer examination, are those stars really supposed to represent the Pleiades and Aldebaran? The actual shape of the cluster as seen with the good naked eye (on a clear night!) is different, and the relative position of Aldabaran is far away. Figure 35 shows what it looks like.

Figure 35 The appearance of the Pleiades cluster, and Aldebaran, in the night sky

Moreover, what is the significance of the puzzling curved line that stretches from the cluster to the Sun in the centre of the diagram?

The Clock

There is a small area of the Rosettes fold out folios with a drawing that some have likened to a clock face, see Figure 36. This identification initially caused some interest from a manuscript dating perspective: clocks with hands were a late medieval development.

Figure 36 A likeness of a clock, in the Rosettes.

However, close examination of the drawing dispels the notion that it is a clock: the pivot point of the two hands is not at the centre of the circle, for one thing, and the "hands" are both of the same length - not very practical for telling the time! In fact, does this look more like a symbol, such as one of the alchemical symbols for Gold shown in Figure 37?

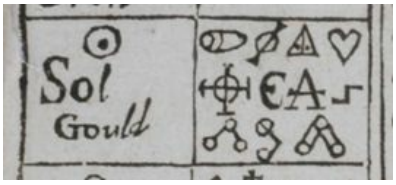


Figure 37 Part of a table of alchemical symbols taken from "The Triumphal Chariot of Antimony" by Basil Valentine (1394-1450)

Joined Faces and T/O Maps

A T/O Map (Orbis Terrarum) is a type of medieval world map that splits a circle O into three parts using a T. An early example is shown in Figure 38, where the regions of the world are labeled Asia, Africa and Europa.

Figure 38 7th Century T/O Map by Isidore of Seville, showing Asia, Africa and Europa.

Figure 39 shows another example, from a manuscript in the Huntington Library:

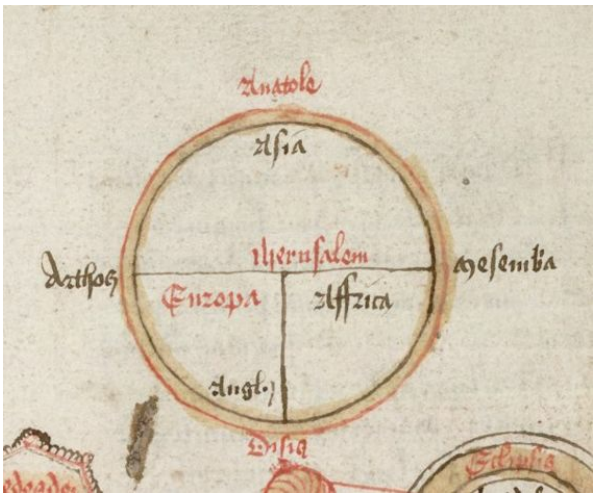


Figure 39 T/O Map from HM64 in the Huntington Library

The Voynich Manuscript contains several drawings that look very similar to T/O Maps. And intriguingly, these drawings include words that may offer a crib into the cipher.

The first example is the T/O Map on folio 68v3, shown in Figure 31. The two quadrants have the words otodol and opcholdg which might correspond to Africa/Cham and Europa/Jafeth respectively (we need to mentally rotate the map through 180 degrees so that it lines up with Isidore's map). The semicircle has the words doar ykeol darol daly solaiin ckhhy olekeey dy ykeol ctheepchy dar, so how that all corresponds to Asia/Sem is a problem – perhaps it's a description of Asia?

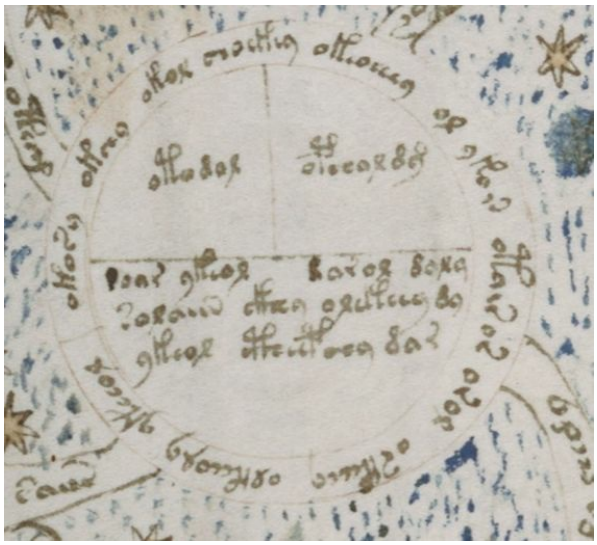


Figure 31 T/O Map from folio 68v

Another T/O Map appears in the Rosettes. The quality of the Beinecke scan is poor on this folio, shown in Figure 32, but the Voynich words appear to be okas (Africa) opac9 (Europa) osal (Asia).

Figure 32 T/O Map in the Rosettes

But maybe these circular diagrams we've looked at are not what they seem, like so many other features of the manuscript. Perhaps they are not T/O maps

at all. A clue that they may not be can be seen in f67v which shows four sets of faces, one at each corner of the folio (Figure 33). The bottom left corner set shows four faces in a “T/O Map” style drawing, and yet the other face diagrams are nothing like T/O Maps. Moreover, a T/O Map by definition is supposed to show three, not four, regions, if one supposes that in this Map the regions are labelled by faces rather than words.

Figure 33 Linked Faces on f67v

In the next section we will see another instance of the T/O Map shape appearing in the Manuscript, although it’s almost hidden from view.

Scratches

In a couple of folios (shown in Figure 34), if we look hard, we can see what at first sight are scratches on the vellum. On closer inspection, these scratches are revealed to be writing. On f86v3 the writing is accompanied by a faint T/O Map, like the ones described in the previous section.

Figure 34 Scratch marks on f66v and f86v3

The letters are hard to make out, but they don't look like the glyphs we find in the text of the manuscript. Some researchers have opined that what we are seeing is the signature of a previous owner of the book, although why he or she would scribble their name so poorly and faintly on one of the inner folios is not explained. Another theory is that these are markings made by the scribe while practicing with a new quill, testing it out before committing to write the main text. In that case, it is likely that what is shown is the scribe's signature.

Bad Porridge

At the bottom left of folio 66r is shown a reclining lady clutching her stomach. Next to her is what appears to be a pot and two speckled circular objects, perhaps food or medicine. The drawing is shown in Figure 35.

Figure 35 A Poorly Lady shown on f66r

Next to the reclined figure and her pots and medicines are four plaintext words, which appear to be *“y”*, *“den”*, *“mus”* and *“del”* (although interpretations vary). Putting these into Google Translate, it detects that the plaintext language is Spanish, with a translation into English: “and give mus”. “Mus” is a Spanish card game, but it only dates back to the 1700s, so this interpretation is unsatisfactory. It’s also not apparently very helpful as a cure to tell the invalid to play a game of cards! This suggests that we’ve misidentified the words. Some researchers say the words are *"der mus del"*, which is old German for "*der Mussteil"*, meaning *"the widow's portion"* . Yet other researchers have posited the words are in fact “*den mus mel*”, which would be something like “the porridge flour” in German and Dutch. Perhaps the lady has eaten some poisonous porridge made with bad flour? Who knows – it’s another case where something in the Manuscript that at first sight looks like it might be simple and easy to interpret ends up being opaque and difficult to pin down.

Miscellaneous Curiosities

There are numerous illustrations in the Manuscript that may provoke the salacious reader to take a second look. A few examples are shown in the following Figures.

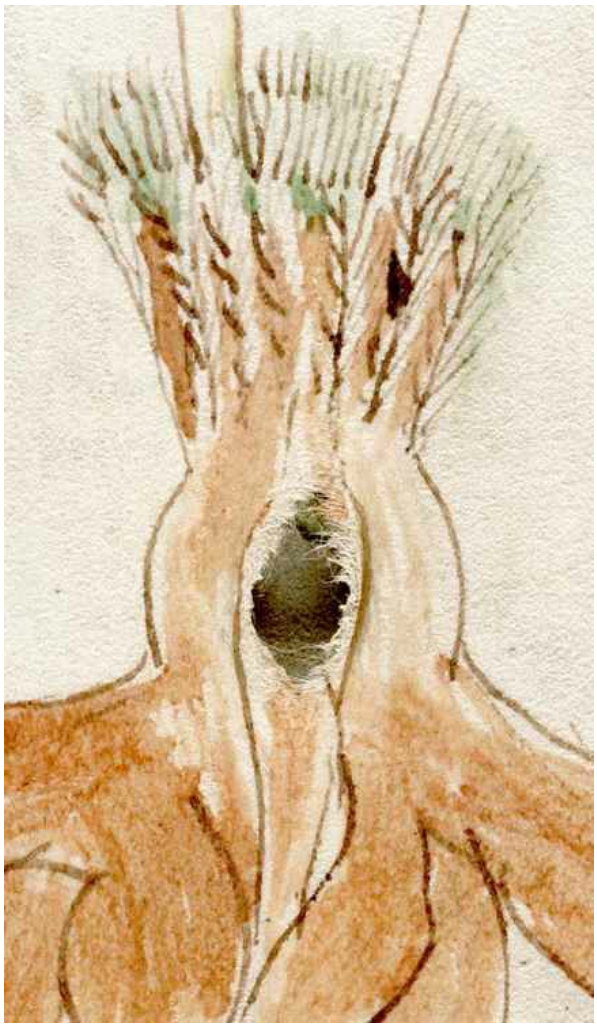


Figure 36 Detail from a root on f34v, which bears a striking similarity to a vulva.

An observation about the hole in the vellum of f34v is that it appears to have been created deliberately, perhaps by rubbing, and is not an original hole in the vellum. One theory is that the Voynich Manuscript is a copy created from a long lost original: when copying f34, the scribe was at pains to recreate a

hole that appeared in the original folio.

Figure 37 Showing a root on f17r in this case appearing to be a double vulva.

Figure 38 An apparently well-endowed hermaphrodite on the foldout f72r1.

Figure 39 The root on f27v looking uncannily like a jigsaw piece.

Figure 40 A section of the root on f55v, suggesting an earless elephant.

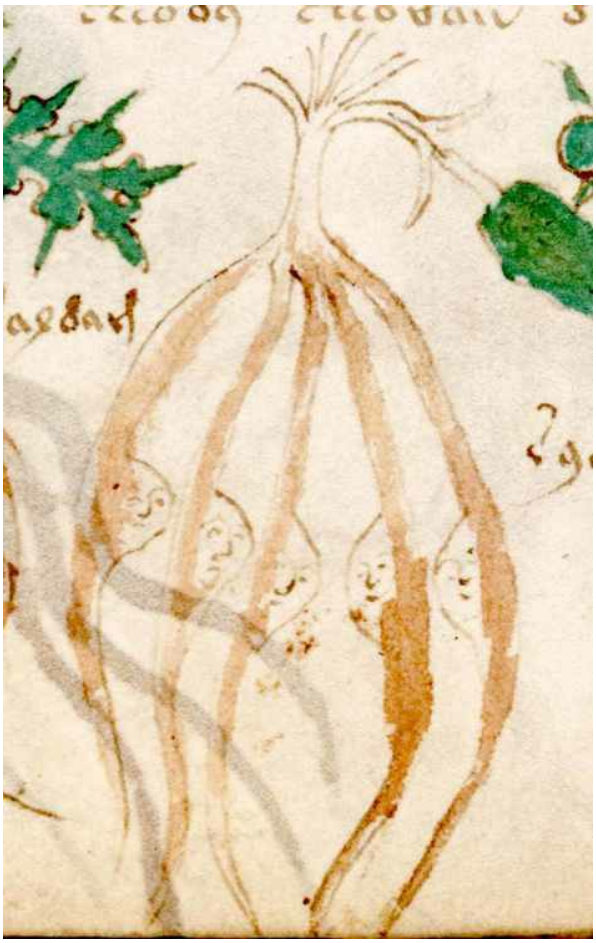


Figure 41 Five faces peering out from roots on f89r.

Figure 42 The spiral plant frond on f56r, suggesting a mathematical series.

The Puzzle of the Folio Ordering

The folios of the Voynich Manuscript are bound between covers that are not original: they were added later, presumably after the original covers failed, were lost, or discarded. Moreover, some folios from the original manuscript are missing, as already noted, and some appear to be out of order.

For example, f78v shows a group of ladies in a bath of green water, with a pipe or stream entering from the top left, and two pipes exiting from the bottom right of the bath, see Figure 43, which also shows the facing folio, f79r.

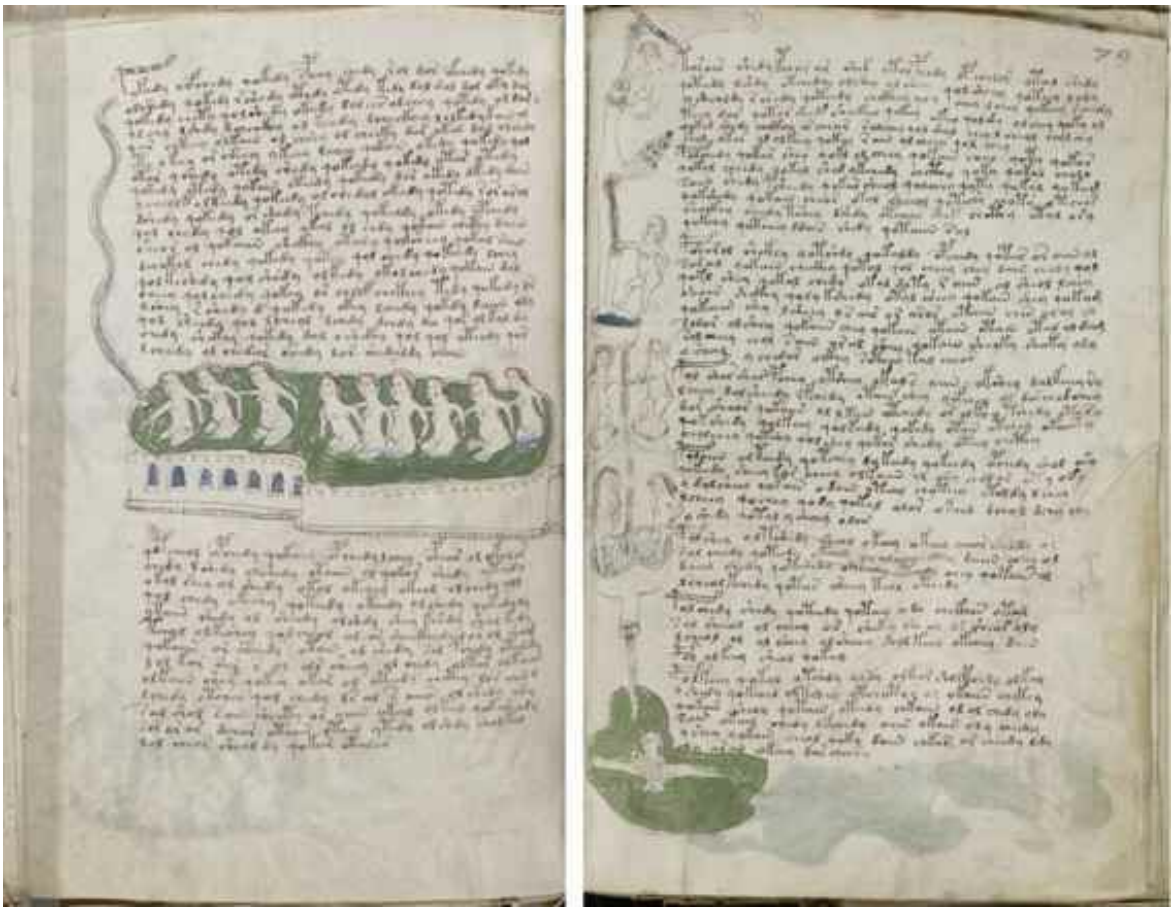


Figure 43 Folio f78v and its facing folio, f79r.

If instead we place folio f81r next to f79r, it appears to fit better - both folios have similar baths, and the pipes join up at the edge of the folios.

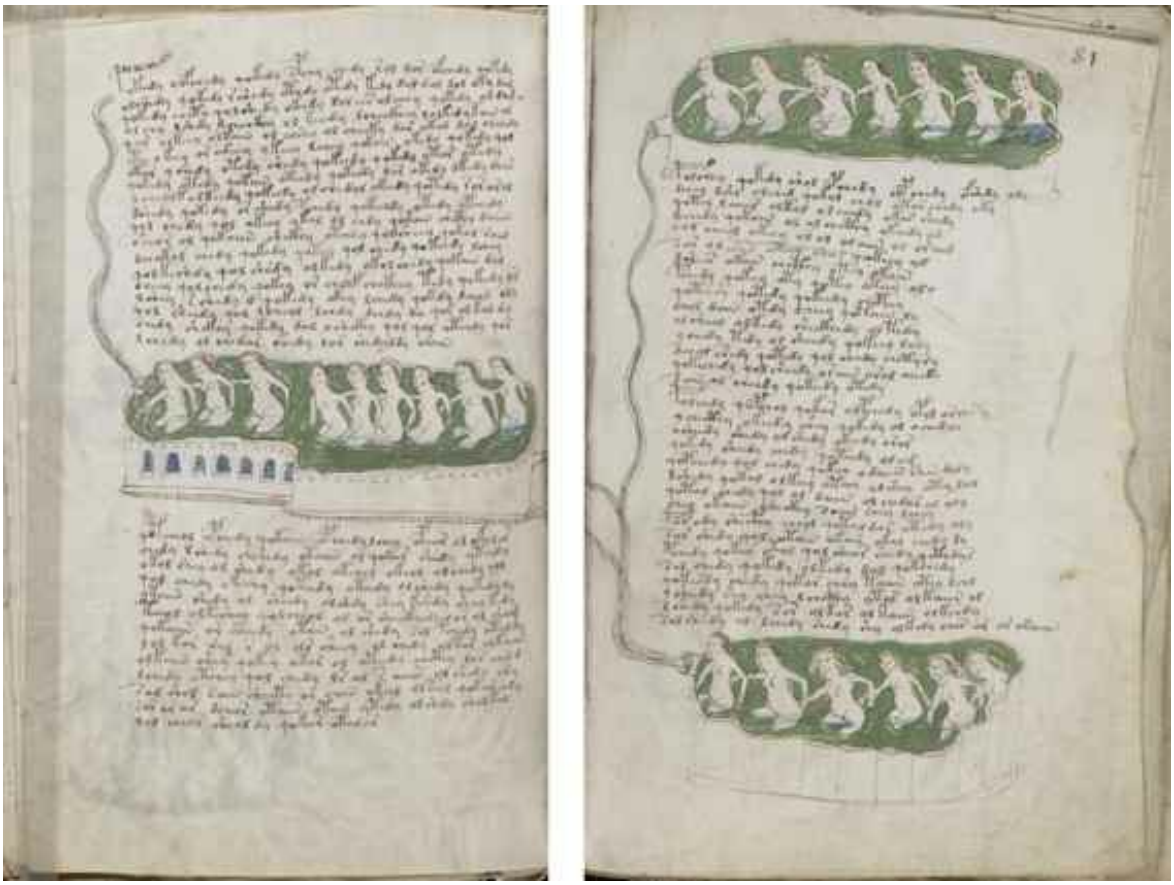


Figure 43 Folio f78v next to f81r.

This suggests that in the original binding folio 81, and not folio 80, followed folio 79.

Perhaps the manuscript's original binding failed at some point, the book fell to the floor, its covers damaged beyond repair, and its folios scattered around? Perhaps then the owner reassembled them, in almost the correct order, before adding new covers? The puzzles here are: what was the original folio order, and what was on the missing folios?

Final Remarks

We have covered the main features of the Voynich Manuscript that are especially perplexing and opaque. Taken individually by a researcher, each puzzle or feature, whether it be an illustration or a property of the writing can be explained (albeit often with some imprecision) by invoking comparisons to known medieval manuscripts, ciphers or other historical precedents. The trouble then is that, when the resulting set of explanations are put together, they turn out to be inconsistent with one another, and cannot be reconciled, despite elaborate logical, semantic or dating contortions, so rendering everything disappointingly implausible and unconvincing. Thus a holistic solution to the Voynich Manuscript's puzzles continues to confound experts and amateurs alike. Some give up in frustration, others declare that it must be a fake, that it is just random gibberish, or that it cannot be solved because it has no solution. Others persist, convinced that they are on the verge of discovering the meaning of what the document contains. And the rest of us simply continue to relish the challenge its decryption poses.

Perhaps the greatest puzzle of the Voynich Manuscript is that despite the close attentions of hundreds of experts and amateur researchers over more than a century, the document remains unread.

Further Reading

This short guide has barely scratched the surface of the intrigues of the Voynich Manuscript. There is a wealth of further information available in five main forms:

- Web sites
- Books (both non-fiction and fiction)
- Blogs (by experts and amateurs alike)
- Discussion Groups
- Email lists

What follows are some recommendations in each of those categories.

Web Sites

The foremost world authority on The Voynich Manuscript is probably René Zandbergen, who maintains an exhaustive and comprehensive set of Web pages at www.voynich.nu. If you read anything else beyond this guide, you must visit René's site.

For exploring images of the folios, and offering a handy means of bookmarking details within them, Jason Davis has the site already mentioned: The Voynich Manuscript Explorer by Jason Davis.

Books

Among the several non-fiction books covering the Manuscript, my recommendations are for Gerry Kennedy's "The Voynich Manuscript: The Mysterious Code That Has Defied Interpretation for Centuries", and for Nick Pelling's "The Curse of the Voynich: The Secret History of the World's Most Mysterious Manuscript".

There are a couple of publications that, while not technically books, are highly recommended. The first is the cryptographer Mary d'Imperio's "The Voynich Manuscript: an Elegant Enigma". This pamphlet from 1978 contains a superb analysis of the Manuscript: the findings she describes remain valid and insightful. Similarly, Brigadier John Tiltman's "The Voynich Manuscript: The Most Mysterious Manuscript in the World", de-classified by the NSA in 2002, makes compelling reading.

If you are looking for full-color reproductions of the Manuscript itself, there are two notable possibilities. The Palatino Press "The Voynich Manuscript: A facsimile of the complete work", (in French) is not recommended, as the pages are bound in such a way as to make the folios difficult to read at the edges, and the facsimiles of the folios are not very clear. The good news is that Yale have now produced a superb facsimile: "The Voynich Manuscript" by Raymond Clemens (Editor), and Deborah E. Harkness (Introduction). This volume has excellent images, and includes several chapters covering various aspects of the manuscript. It contains all the foldouts, including the complex Rosettes folios.

Blogs

Study of the Voynich Manuscript is a globally disorganised endeavor, with many amateurs (and a few experts in their spare time) each typically working independently of one another. This is not necessarily a bad thing! The result is that there are dozens of blogs devoted to studies of the Manuscript. Some are more organised than others, and new ones are cropping up all the time. The blogs in the following list are a few of the better ones.

- Ellie Velinska's Voynich Blog - Ellie focusses mainly on the imagery in the Manuscript.
- Elmar Vogt's blog - Elmar's profound insights come from studying the Manuscript for many years.
- H.R. SantaColoma's Blog - Rich believes the work to be an elaborate hoax.
- J.K.Petersen's Blog - JKP delves into the minutest details of the text and drawings found in the folios.
- Knox Mix's Wiki - Knox specialises in statistical analyses of the text.
- Nick Pelling's blog - Nick's site covers mysterious ciphers in general, the Voynich included.
- Philip Neal's webpages - Philip's careful work is based on his extensive academic credentials in medieval languages.
- Robert Teague's Voynich Blog - The late Robert Teague focussed on interpreting the star constellations in the Manuscript.
- Ruby Novačna's Blog - Ruby's investigations (in French) cover most aspects of the Manuscript.
- Thomas Sauvaget's Blog - Thomas studies details of the text and has made a detailed analysis of the quire numbering.
- Stephen Bax's Blog - Stephen has approached the Manuscript as an academic linguist, and claims decryption of several words.
- Voynich Attacks - Julian mainly covers attempts to decipher the text using machine learning computing techniques.

Discussion Groups

At the time of writing, the preeminent discussion group devoted to the Voynich Manuscript is the Voynich Ninja.

Email Lists

The most significant and active email list for discussions about the Manuscript is the Voynich Manuscript Mailing List. The list has a fine history, going back to 1991, when it was created by Jim Gillogly and Jim Reeds. Rich SantaColoma is the current list manager (December 2016).

Table of Contents

Preface
Introduction
The First Folio
The Text
- Entropy
- The Labels
- Currier Language A and B
- The Gallows Glyphs
- The 4o Glyph(s)
- daiin daiin daiin
- Or Or Or r
- Sequences of Slightly Differently Spelled Words
- The Month Names
- The Cipher Key and Picnic Table Glyph
- Code of Urbino (1440)
- The Theory of Numbers
- Michiton Oladabas
- Plaintext on f17r

The Drawings
- The Plants
- The Armadillo
- The Spread Eagle
- The Jars
- The Castles in the Rosettes
- The Naked Ladies and Pipes
- The Archer
- The Pleiades
- The Clock
- Joined Faces and T/O Maps
- Scratches
- Bad Porridge
- Miscellaneous Curiosities

The Puzzle of the Folio Ordering
Final Remarks

Further Reading
- Web Sites
- Books
- Blogs
- Discussion Groups
- Email Lists
- Acknowledgments